YAKEEN NEET 2.0

2026

Basic Maths and Calculus (Mathematical Tools)

Physics

Homework Solution-02

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H/W

$2^0 = 1$

$2^{\alpha} = \alpha$

$2^{-\alpha} = \frac{1}{2^{\alpha}} = \frac{1}{\alpha} = 0$

$e^1 = e$

$e^0 = 1$

$e^{\alpha} = \alpha$

$e^{-\alpha} = 0$

$\frac{1}{(0.4)^{\alpha}} = ? = \frac{1}{0} = \alpha$

$(0.4)^2 = 0.16$

$\frac{1}{0} = \alpha$

$\alpha \begin{cases} (0.2)^{\alpha} = \text{zero} \\ \frac{1}{(0.2)^{\alpha}} = \frac{1}{\left(\frac{2}{10}\right)^{\alpha}} = \left(\frac{10}{2}\right)^{\alpha} = (5)^{\alpha} = \alpha \end{cases}$

$\frac{1}{\alpha} = 0$

$\frac{1}{0} = \alpha$

Question

H/W (rough)

If $\sin\theta = 3/5$ then find $\cos\theta$, $\tan\theta$.

$\sin\theta = \frac{3}{5} = \frac{P}{H}$ $\qquad B = \sqrt{H^2 - P^2} = \sqrt{25-9} = \sqrt{16} = 4$

$\cos\theta = \frac{B}{H} = \frac{4}{5}$

$\tan\theta = \frac{P}{B} = \frac{3}{4}$ }

If $\sin\theta = 4/3$ then find $\cos\theta$ and $\tan\theta$?

↳ $\sin\theta = \frac{4}{3}$ ← Not Poss.

$\sin\theta = \frac{3}{4}$ ✓ Possible

Question

If [redacted] then find $\sin\theta$ and $\cos\theta$.

$\cot\theta = 3$

$$\cot\theta = \frac{B}{P} = \frac{3}{1}$$

$$H = \sqrt{P^2 + B^2}$$

$$= \sqrt{10}$$

$$\sin\theta = P/H = \frac{1}{\sqrt{10}}$$

$$\cos\theta = B/H = \frac{3}{\sqrt{10}}$$ ✓

Question

H/W (rough) Notes

π rad $= 180°$

2π rad $= 360°$

Convert following radian into degree?

(i) $\frac{\pi}{2}$ rad $= \frac{180}{2} = 90°$

(ii) $\frac{\pi}{4}$ rad $= \frac{180}{4} = 45°$

(iii) $\frac{\pi}{3}$ rad $= \frac{180}{3} = 60°$

(iv) $\frac{5\pi}{6}$ rad $= \frac{5}{6} \times 180^{30} = 150°$

(v) $\frac{2\pi}{3}$ rad $= \frac{2}{3} \times 180^{60} = 120°$

(vi) $\frac{4\pi}{3}$ rad $= \frac{4}{3} \times 180^{60} = 240°$

(vii) $\frac{3\pi}{5}$ rad $= \frac{3}{5}(180^{36}) = 108°$

$\frac{720}{180} = \frac{90°}{}$

(viii) 5π rad $= \boxed{5 \times 180°} = 900°$ ✓

(ix) $\frac{2\pi}{5}$ rad $= \frac{2}{5}(180^{36}) = 72°$

(x) $\frac{7\pi}{12}$ rad $\rightarrow \frac{7}{12} \times 180^{15}$

$= 105°$

(xi) $\frac{5}{2}\pi$ rad ✓

(xii) $3\ (\pi \text{ rad}) = 3 \times 180° = 540°$

(xiii) $\frac{\pi}{6}$ rad $= 30°$ ✓

Question H/W

$360° = 2\pi$

Convert following into radian

(i) $45° = \frac{\pi}{4}$

(ii) $60°$

(iii) $120° = 120 \times \frac{\pi \text{ rad}}{180} = \frac{2\pi}{3}$

(iv) $30° = \frac{\pi}{6}$ rad

(v) $150° = 150 \times \frac{\pi \text{ rad}}{180} = \frac{3\pi}{6}$

(vi) $90° = \pi/2$ rad

(vii) $\pi^\circ = \pi \times 1° = \pi \frac{\pi \text{ rad}}{180} = \frac{1}{17}$ rad

(viii) $270° = 270 \times \frac{\pi \text{ rad}}{180} = \frac{3\pi}{2}$

(ix) $135° = \frac{3\pi}{4}$

(x) $720° = 4\pi$

(xi) $36° = 36 \frac{\pi \text{ rad}}{180} = \frac{\pi}{5}$

(xii) $450° = 450 \times \frac{\pi \text{ rad}}{180} = \frac{5\pi}{2}$ rad

(xii) $240° = \frac{4\pi}{3}$ r

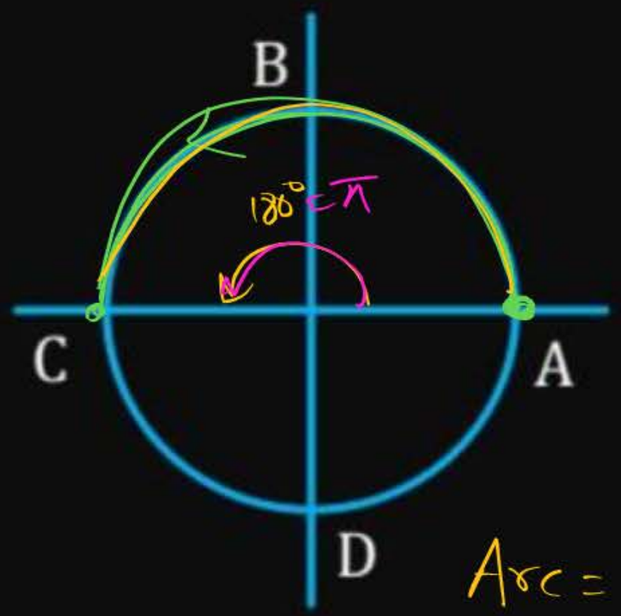
(xiv) $330° = 330 \times \frac{\pi}{180}$ r

(xv) $57° = 57 \frac{\pi}{180}$ r

(xvi) $360° = 2\pi$ r

Question H/W

When object moves from point A to C on the circle the find total distance moved by object. (R = 5m)



$$\text{Arc} = R\theta$$

$$= 5 \times 180^\circ \times$$

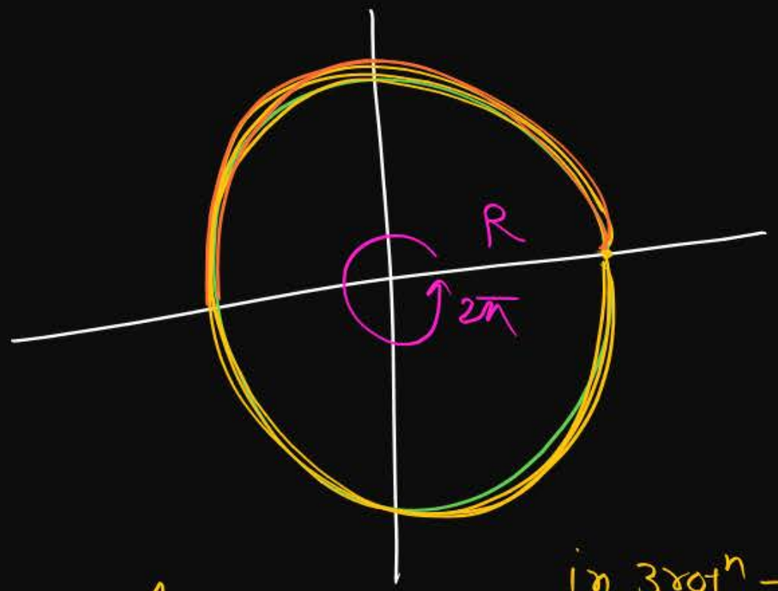
$$= 5 \times \pi \text{ rad}$$

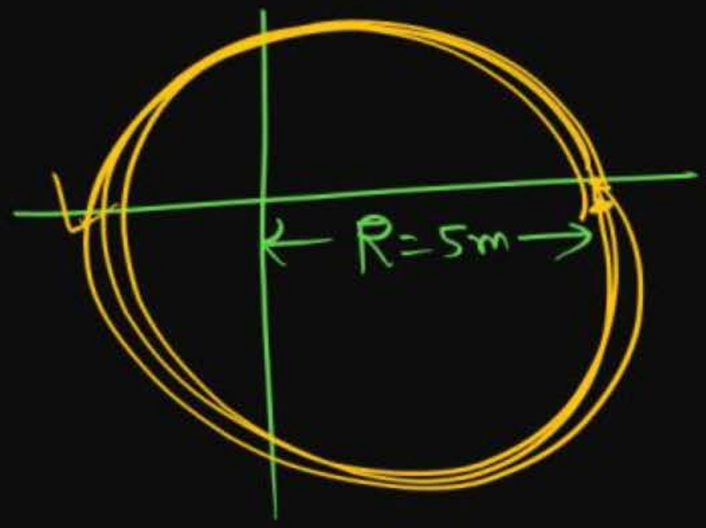
$$= 5\pi \text{ rad}$$

Question 2° H/W

Total distance moved by object on the circle of radius 5m in 3 and half rotation

[IIT] [NEET]





Arc = θR

= 2πR

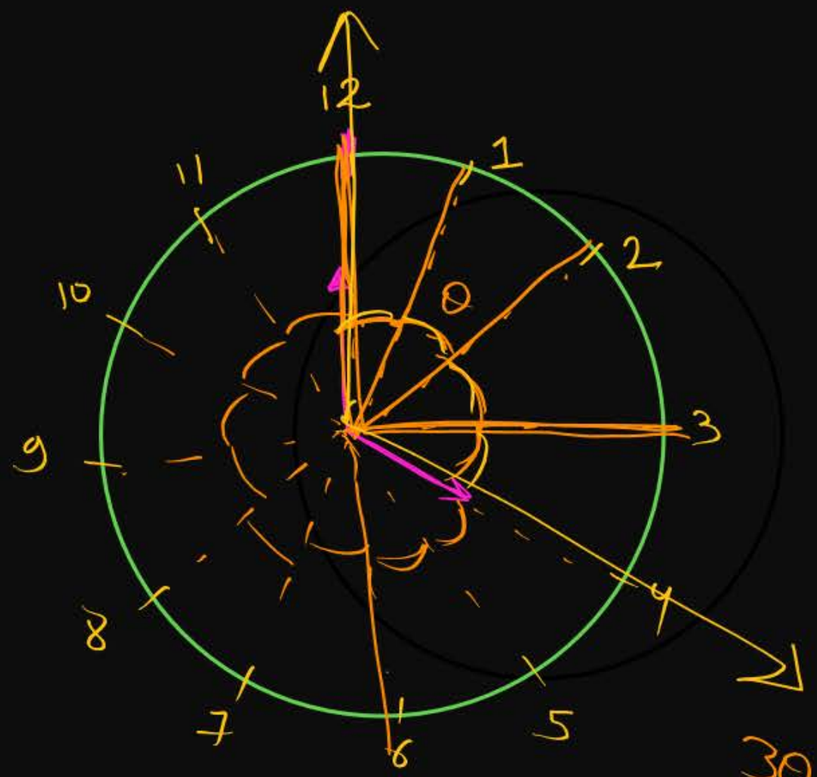
in 3 rotn = 3(2πR)

= 6πR

in 3½ rotn = 7πR

Question H/W

When a clock shows 4 O'clock, how much angle do its minute and hour hand make.



Angle b/w mint hand & hr hand is $4\theta = 4 \times 30^\circ$

$= 120^\circ$

$30 = \frac{\pi}{2}$ rad

$120\theta = 2\pi$

$\theta = \frac{\pi}{6}$ rad $= 30^\circ$

$360^\circ = 2\pi$ rad

Question H/W

If $\frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta}=\frac{11}{5}$ then find value of $\tan\theta$

$5\sin\theta+5\cos\theta=11\sin\theta-11\cos\theta$

$16\cos\theta=6\sin\theta$

$\frac{16}{6}=\frac{\sin\theta}{\cos\theta}=\tan\theta$

$\tan\theta=\frac{8}{3}$ *

Question H/W

Find value of $\sin^2(40°) + \cos^2(40°)$ = 1

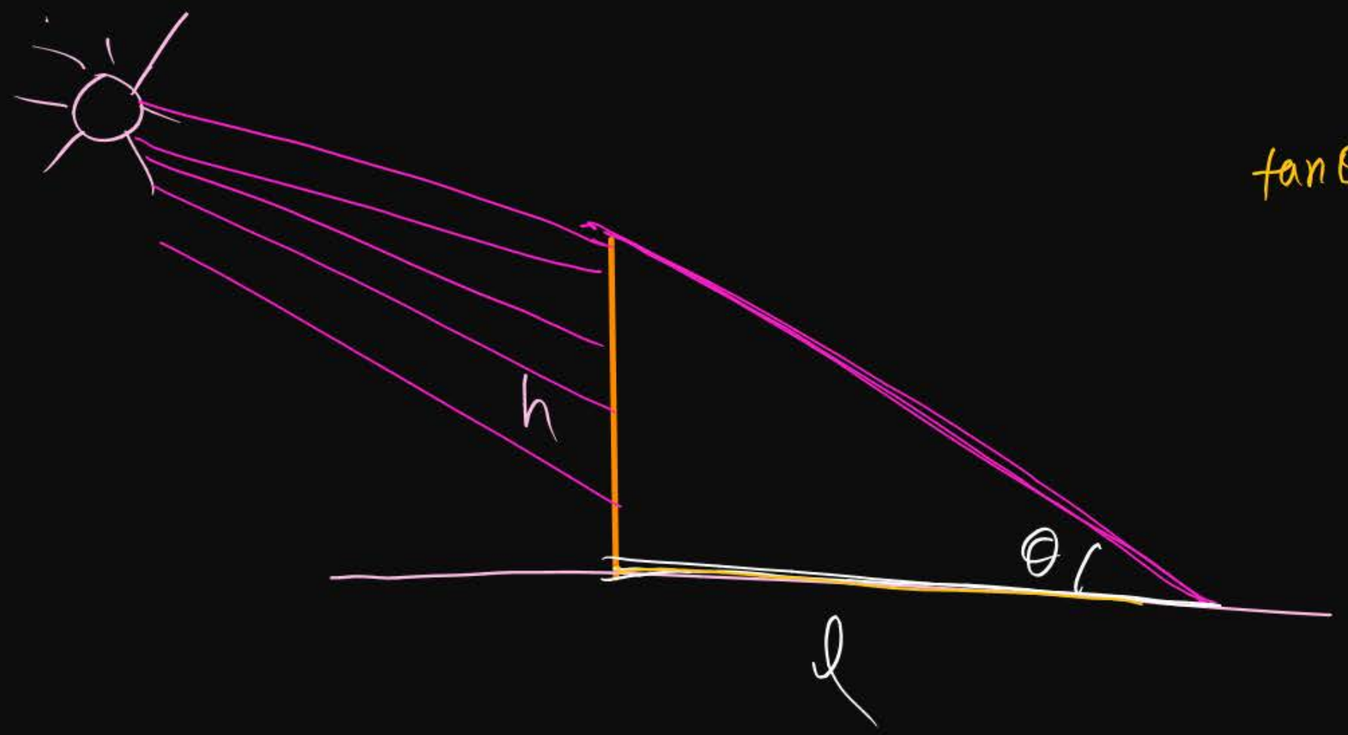
$$\sin^2\theta + \cos^2\theta = 1$$

Question H/W

A vertical pole of height h casts a shadow of length l when the Sun is at an angle θ above the horizon.

Which of the following expresses the shadow length l in terms of h and θ?

1. $l = h \cdot \tan\theta$
2. $l = \dfrac{h}{\tan\theta}$
3. $l = h \cdot \sin\theta$
4. $l = \dfrac{h}{\sin\theta}$



$\tan\theta = \dfrac{h}{l}$

$l = \dfrac{h}{\tan\theta}$

Question

Two towers are separated by a horizontal distance D. From the top of the first tower (height h_1), the angle of depression to the top of the second tower (height h_2) is θ.

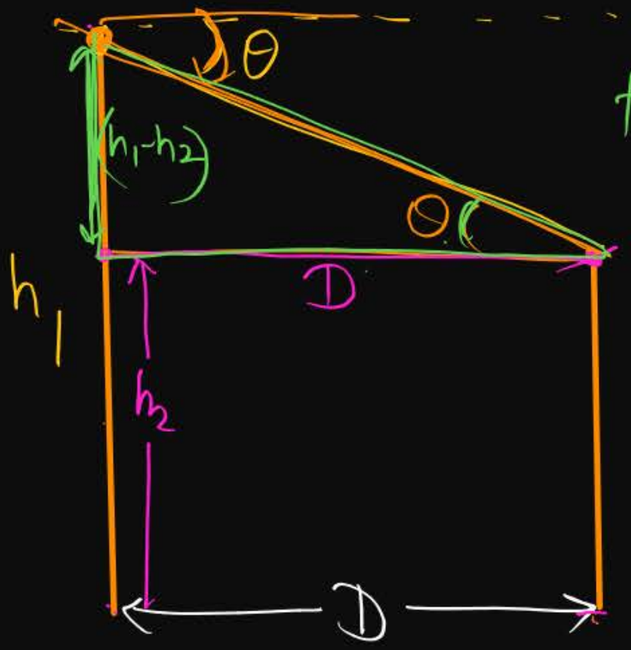
Which relation correctly gives the horizontal separation D in terms of h_1 . h_2, θ?

1. $D = \dfrac{h_1 + h_2}{\tan\theta}$

2. $D = \dfrac{h_1 - h_2}{\tan\theta}$ ✓

3. $D = \dfrac{h_2 - h_1}{\tan\theta}$ ✗

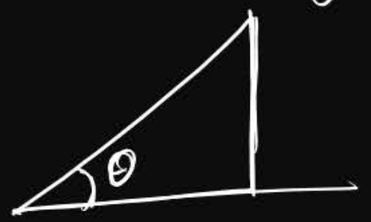
4. $D = \tan\theta \,.\, (h_1 + h_2)$

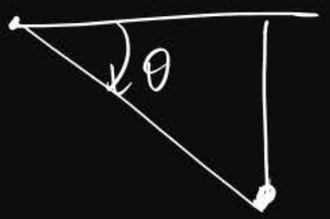


$\tan\theta = \dfrac{h_1 - h_2}{D}$

$D = \dfrac{h_1 - h_2}{\tan\theta}$

elevation Angle





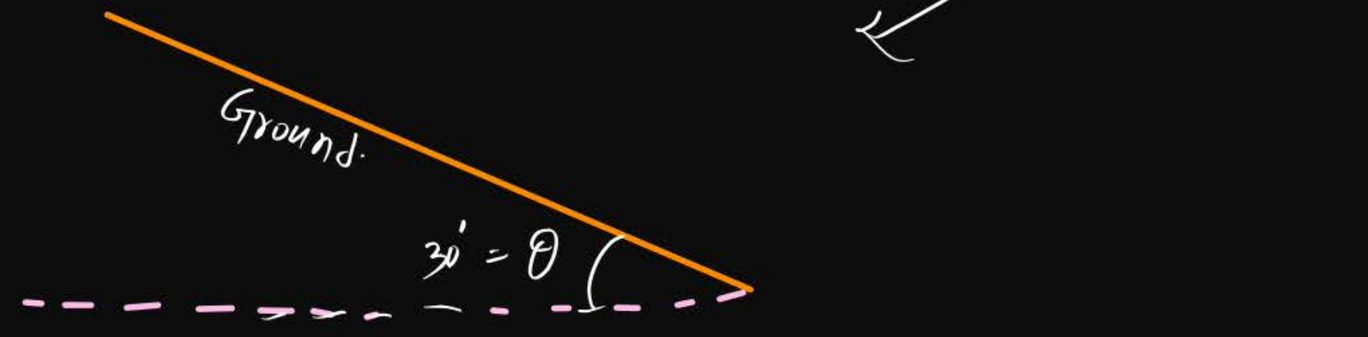
Question

H/W से करना है

A vertical pole of height $h = 10$ m stands on ground that slopes upwards at a constant angle $\alpha = 30°$ with the horizontal. If the sun's angle of elevation above the horizontal is $\theta = 60°$, what is the length of the shadow cast by the pole on the sloping ground?

↳ Inclined plane

1. 5 m
2. 10 m
3. $10\sqrt{3}$ m
4. $\frac{10}{\sqrt{3}-1}$ m



THANK YOU